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Translated from German by  
SCIENTIFIC TRANSLATION SERVICES  
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- (19) European Patent Office  
(11) EP 1 028 150 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of Publication: August 16, 2000 Patentblatt 2000/33

(21) Application No.: 99106921.2

(22) Date of Filing: April 08, 1999

(51) Int. Cl.<sup>7</sup>: C09G 1/00

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(84) Designated Contracting States:  
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE  
Extended Designated States:  
AL LT LV MK RO SI

(30) Priority: February 10, 1999 CH 25799

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(54) Protective and Shiny Coating from Water-soluble Polymers for Care Against Subsequent Soiling

(57) Protective and shiny coating from water-soluble polymers against subsequent soiling and for the care of the surface of basic consumer goods. The said coating is applied either from an aqueous solution during the normal cleaning operation or in a separate operation. The water-soluble polymers may also form a solid object which is arranged inside dishwashers or is used as a powder, film or in solution. Other additives in the water-soluble polymers may contain disinfecting, cleaning, metal-protective, water-softening, deodorizing, antifreeze and odoriferous active ingredients as well as specific care ingredients.

## Specification

### Introduction

5 [0001] Cutlery is washed in dishwashers in most households in industrialized countries. The mechanical cleaning effect during hand washing is replaced by sharp water jets and a relatively highly alkaline dishwasher detergent here. The consequence of this operation is that the surface of china, glass and metals is attacked in a short time and becomes dull after a longer time. The soil adheres even better at the time of the subsequent soiling.

10 [0002] The modern cleaning agents for bathrooms, toilets, window panes and kitchens as well as many consumer goods also contain relatively corrosive chemicals, which do not offer any protection against a subsequent soiling, even though they clean the surface being treated well.

15 [0003] The present invention describes various products and processes for applying a shiny protective surface on the cleaned surface, which can retard the subsequent soiling and prevent the adhesion of the soil to the surface.

### Description of the Present Invention

20 [0004] The present invention pertains to one or more small plastic bodies consisting of water-soluble polymers which are introduced into the dishwasher or into the cleaning agent and remain there until they are completely dissolved. A very small quantity of the water-soluble polymer dissolves in the rinse water during each washing operation and forms a shiny film on the china, enamel, glass and metal surfaces of the dishes and the cutlery.

25 [0005] Another embodiment of the present invention pertains to a film consisting of water-soluble polymers, which is placed either over the surface to be protected or dries directly from an aqueous solution by spraying or coating on the surface and adheres thereto.

30 [0006] In another embodiment, the mixture of the water-soluble polymers can be processed into a film. The polymer film is used to pack the detergent in the form of an individual dispensing package. It will then dissolve during the washing operation and part of the polymers forms the shiny protective film on the washed surfaces.

35 [0007] Other additives which can be incorporated in the water-soluble polymer serve the purpose of additionally achieving effects which are pleasant for the customer.

40 [0008] The following shall be mentioned, without laying claim to completeness: Bactericidal active ingredients which disinfect the interior space of the dishwasher, perfumes to produce a pleasant odor, as well as complexing agents and acids which counteract the deposition of lime.

45 [0009] Our experiments surprisingly showed that the natural organic polymers bone glue, gelatin and the synthetic polymers of vinyl alcohol (polyvinyl alcohol) are soluble in small quantities only in the hot rinse water of a dishwasher if they are present in the form of a compact body. The small soluble portion is dissolved only from the surface of the compact body. However, this small quantity is sufficient to form an invisible protective and shiny film on the surface of china, enamel, paint, plastic, glass and metal during the rinsing operation.

[0010] This protective film brings about a better shine of the dishes. It also reduces the adhesion of food residues (tea, coffee, lipstick, etc.) during the subsequent use of the dishes. Better stability of the head in glass washed with this solid shiny rinse in the dishwasher was found in the case of beer glasses.

5 [0011] The effect is obtained if the said polymers are added to powdered or gel-like detergents in the form of small granules or a prefabricated, water-soluble film is used as a packaging for an individual dose.

10 [0012] The water-soluble polymer film may also be applied to the surface to be protected as a solution by spraying, brushing or rolling. The protective layer thus dried dissolves slowly during use and prevents the incrustation of soil as a result. This embodiment is especially suitable for toilet bowls and sinks.

15 [0013] By suitable formulation, it is possible to enclose additives in the said water-soluble polymers which further improve the use of the shiny rinse in the dishwasher or generally during the washing and cleaning operation and make it more pleasant.

20 [0014] Advantageous additives are:

a) Bactericides, e.g., Irgasan DP-300 (Ciba S.C., Basel). A musty odor, which develops especially in older dishwashers and toilet bowls due to microbial decomposition, is prevented by killing bacteria.

25 b) Scents and perfumes. They cause a pleasant odor.

c) Lime deposit preventing agents, such as citric acid, fumaric acid and other fruit acids, as well as inorganic and organic ion exchangers.

30 d) Metal-protective agents.

e) Antifreezes for windshield washer systems of automobiles.

35 f) Surfactant mixtures with and without water for windshield washer systems as well as additives in the form of alcohol, methyl glycol and enzymes.

g) Sodium carbonate, nonionic surfactants, bleaches based on oxygen, phosphates, protease and amylase.

40 h) Agricultural pesticides and care agents.

i) Bases for car wash detergents.

k) Leather and plastic care agents.

45 l) Glass cleaners of any kind.

m) Emulsifying agents.

n) Floor cleaning agents, especially for stone and tile floors.

[0015] The present invention shall be explained in greater detail below on the basis of the following examples:

**Example 1: Solid Shiny Rinse Forming a Protective and Shiny Coating with Polyvinyl Alcohol**

[0016]

Polyvinyl alcohol*	84.0%
Irgasan® DP-300 (Ciba S.C., Basel)	0.5%
Perfume Citrone 38,481 (Firmenich SA, Geneva)	9.0%
Glycerol monooleate	5.0%
Aerosil®	1.0%
Citric acid	0.5%
	100.0%

[0017] Preparation: All components are mixed intensely and extruded at 220°C. Injection molding in the form of a ball weighing about 30 g. Under normal conditions of use in the household, this ball remains in the dishwasher for 5-6 weeks before it is completely dissolved.

**Example 2: Shiny Rinse Forming a Protective and Shiny Coating with Gelatin and Starch**

[0018]

Gelatin type A 200	10.0%
Corn starch	10.0%
Citric acid	0.5%
Polyvinyl alcohol*	64.5%
Perfume Citrone 38,481 (Firmenich SA, Geneva)	15.0%
	100.0%

**Preparation:**

[0019] All components are mixed thoroughly and then injection molded into balls weighing about 30 g at 230°C. These balls dissolve slowly in the dishwasher and last about 6 weeks under normal conditions until complete dissolution.

[0020] The mixtures according to Examples 1 and 2 may also be injection molded in the form of granules, tablets or stars with a diameter of 1-2 mm and be added to a powdered or gel-like detergent.

[0021] \* Various manufacturers (Clariant, DuPont, Wacker Chemie, Soltec) supply suitable types of polyvinyl alcohol. Mowiol® 8-88 from Clariant, Germany, was used in this example. The solubility and consequently also the lifespan of the solid shiny rinse can be controlled by combination with a less readily soluble type of Mowiol, e.g., 10-98.

**Example 3: Water-Soluble Protective Coating for Sinks and Toilet Bowls****[0022]**

Water	67.85
Gelatin, type A200	2.00
Polyvinyl alcohol*	18.00
Glycerol	6.00
Perfume, Citrone 38,481 (Firmenich, Switzerland)	3.50
Tween 20 (ICI, Great Britain)	0.50
Bardac 22 (Lonza, Switzerland)	2.00
Benzoic acid	0.05
Citric acid	0.10
Colorant as desired	
	100.00

**Preparation:**

[0023] The gelatin and the polyvinyl alcohol are dissolved in water, and the other components are then added. The highly viscous coating is applied to the inner surface of toilet bowls or other ceramic containers with a brush, roller or another applicator. A solid layer is formed on drying, which dissolves from the surface during the use slowly layer by layer and thus prevents soil from adhering.

**Example 4: Liquid All-Purpose Cleaner for Ceramic, Glass, Dishes, Screens and Other Surfaces****[0024]**

Water	70.5
Polyvinyl alcohol*	1.5
Hi Cap (National Starch, U.S.A.)	1.0
Gelatin, type 1200	0.5
Texapon NSO IS (Henkel, Germany)	25.0
Comperlan KD (Henkel, Germany)	2.0
Perfume, Citrone 38,481 (Firmenich, Switzerland)	0.3
Kathon CG (Rohm & Haas, U.S.A.)	0.2
	100.0

**Preparation:**

[0025] The polyvinyl alcohol and the gelatin are dissolved in hot water, after which the other components are added and mixed thoroughly.

### Example 5: Water-Soluble Film Deodorant Imparting Shine for Packaging Dishwasher Detergent Tablets or Powders

[0026]

Perfume, Citrone, natural or identical to natural	3.5%
Tween 20 (ICI Surfactants, GB) (sorbitan laurate, ethoxylated)	2.5%
Soltec 1220 T10 (Soltec, France) (polyvinyl alcohol for foils)	94.0
	100.0%

#### Preparation:

[0027] The perfume and Tween 20 are mixed homogeneously and stirred into the granular Soltec. The experimental foil was blown at 160-180°C into a film with a thickness of 100-120  $\mu\text{m}$  with a Brabender film-blowing unit. If this foil is used to package tablets or powders which will be used as individual doses of dishwasher detergents, the following advantage will arise compared with the normal foil packaging:

[0028] The packaging foil does not have to be removed and therefore there is no contact with the corrosive detergent.

[0029] The foil dissolves during the washing operation and causes a beautiful shine on the dish and a pleasant odor in the dishwasher.

### Example 6: Liquid Detergent for Windshields of Automobiles

[0030]

Water	90.0
Solvent APV (Hüls Chemie, Germany) (diethylene glycol monoethyl ether)	5.0
Texapon T42 (Henkel, Germany) (triethanolamine lauryl sulfate)	1.7
Hi-cap (National Starch, U.S.A.) (chemically modified dextrin)	0.5
Mowiol 8-88 (Clariant, Switzerland) (polyvinyl alcohol)	2.0
Glycerol	0.8
Preservative	q.s.
	100.0

[0031] Preparation: Dissolve Mowiol in boiling water, then add and dissolve the other components. It can be used directly or diluted.

**Example 7: Shiny Detergent Solution for Leafy Plants****[0032]**

Water	97.2
Mowiol 8-88	1.0
Hi-cap	0.5
Texapon NSO (Henkel, Germany)	0.1
Glycerol	1.5
Preservative	q.s.
	100.0

**[0033]** Preparation: Dissolve Mowiol in hot water, then add and dissolve the other components. It can be used concentrated or diluted with water.

**Patent Claims**

1. Protective, shiny and care coating against subsequent soiling on the surface of consumer goods made of glass, ceramic, china, clay, leather, metal and plastic as well as on plant parts, characterized in that it consists of water-soluble polymers which automatically form a coating on the surface to be protected from the aqueous detergent, care or cleaning solution during the normal cleaning operation and subsequently firmly adhere to the said surfaces and are dissolved by water only slowly and after a prolonged, continuous use.
2. Protective coating in accordance with claim 1, characterized in that it is applied to the surface to be protected by spraying or with a mechanical coating device.
3. Protective coating in accordance with claims 1 and 2, characterized in that the water-soluble polymers form a solid object or film which is arranged inside dishwashers and releases a small quantity of the polymers on contact with the rinse water during the cleaning operation, and this polymer forms a coating on the surface of china, enamel, paint, glass, plastic and on metal surfaces as a protecting and shiny film and is used as a solution or emulsion.
4. Protective coating in accordance with claims 1, 2 and 3, characterized in that the said water-soluble polymers are gelatin, bone glue, starch or chemically modified starch derivatives, polyvinyl alcohol or a mixture of these substances.
5. Protective coating in accordance with claims 1, 2, 3 and 4, characterized in that it additionally also contains components and active ingredients such as bactericides, disinfectants, perfumes and odorants, metal-protective agents, water softeners, acids and other additives which make its use pleasant for the user.
6. Protective coating in accordance with claims 1, 2, 3, 4 and 5, characterized in that the solid object formed by the water-soluble polymers has a weight of 0.01-100 g, preferably 0.1-30 g and is in the form of a disk, foil, ball, a lemon or another fruit and its weight,

shape and composition are selected to be such that it will completely dissolve after a predetermined time during regular washing in the dishwasher.

7. Protective coating in accordance with claims 3 and 6, characterized in that the said object is prepared by injection molding, extrusion, film blowing or another method commonly used in the plastics industry.
8. Protective coating in accordance with claims 6 and 7, characterized in that the said object is firmly connected to a small container or base consisting of an insoluble material, which allows the water to come into contact with the object and which makes it possible to fasten it inside the dishwasher and prevents dripping off.
9. Protective coating in accordance with claims 1 through 8, characterized in that the water-soluble polymers are dissolved directly in the concentrated cleaning agent or care agent or surround the solid cleaning or care agent as a film, capsule or coating composition.

➤ 133: 179028e Water-soluble polymer coating compositions for rendering solid surfaces glossy and soiling-resistant. Holzner, Gunter Wolfgang; Karg, Ernst Jorn (Tufty G.m.b.H., Germany) Eur. Pat. Appl. EP 1,028,150 (Cl. C09G1/00), 16 Aug 2000, CH Appl. 1999/257, 10 Feb 1999; 7 pp. (Ger). The title compns., useful for surface protection of articles made of glass, ceramics, china, glazed porcelain, clay, metal and plastic, comprise H<sub>2</sub>O-sol. polymers, e.g., gelatins, bone glue, (modified) starch and/or poly(vinyl alc.) (PVA). The coatings can be deposited from aq. cleaning agent solns., e.g., rinse solns. used in dishwashing machines or can be molded and suspended, e.g., inside a dishwashing machine where they slowly dissolve in the rinse solns. For example, a moldable compn. contained PVA 84.0, Irgasan DP-300 0.5, perfume 9.0, glycerol monooleate 5.0, aerosil 1.0 and citric acid 0.5%.